南極湖沼における湖底堆積物間隙水の栄養塩分布

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Nutirients distribution in gap water of Antarctic lake sediments

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One of the most productive ecosystems in continental Antarctica is found in freshwater lakes, where benthic microbes form thick mats [1, 2], and aquatic mosses can flourish on the lake beds of the Sôya Coast region [3]. This is despite low nutrient levels, low temperatures, and seasonally limited solar radiation. In previous studies, we examined the detailed light environment in the water columns, and light usage and protection of the phytobenthic communities in Antarctic lakes, and have revealed that the phytobenthos allowed the growth and survival by using the possible light energy while preventing from death during a short but strong light summer [2, 4]. Because the Sôya Coast lakes are oligotrophic and have sparse phytoplankton, the flux through the water column to the sediments of detrital, algal-derived organic material may be much lower. A question arise where can the benthic phototrophs obtain nutrients from in such oligotrophic lake ecosystems? To dissolve this question, we tried to reveal the nutrients in gap water of Antarctic lake sediments and the vertical profiles which remain to be defined.

Lake sediment cores (length 5-45 cm) and lake waters were collected from seventeen Antarctic freshwater lakes over a wide range of the Sôya Coast region in 2009-2010. The collected sediment cores were sectioned at 1 cm intervals from the bottom to surface, and the gap waters were separated from the each section, followed by filtration (pore size 0.2 μm). NH4+, NO2-, NO3-, PO4-, and SiO2- concentrations in the lake water and the sediment water samples were analyzed and determined colorimetrically using QuAAtro and AACS-II Autoanalyzer system (BRAN+LUEBBE). We report the data of nutrients in lake waters and sediment waters of various lake types, and discuss about relationship of the lake type and the nutrients distribution in gap water of lake sediments.

References

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